

A KEY TO THE SPECIES OF THE GENUS *CENTRUROIDES* MARX (SCORPIONIDA: BUTHIDAE)¹

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ABSTRACT: This is not a revisionary study. A key to the species of the genus *Centruroides*, as presently recognized, is presented for the non-systematist. Diagnostic characteristics of the genus are given, followed by a list of 37 species and a key for their determination. A list of subspecies of *Centruroides* is given followed by synonymies of the *Centruroides* species and additional species placed in the old genus *Centrurus*. The discussion points up the need for a revisionary study because of the creation of artificial species due to over-weighting the color characteristics and failure to recognize adequate diagnostic features.

DESCRIPTORS: *Centruroides* key; *Centruroides* diagnosis; Scorpionida; Buthidae; *Centruroides* species synonymy.

The growing interest in the genus *Centruroides* by disciplines other than systematics has suggested the need for a key to the presently recognized species. This paper is not intended as a revisionary study of the genus, but simply the offering of a key constructed some time ago for personal use. The nomenclature and measurement methods employed follow the suggestions made by Stahnke (1970). Subspecies are not included in the key but are listed later.

Scorpions included in the key are those members of the family Buthidae characterized as follows:

Tibial spurs lacking; interior and exterior pedal spurs well developed, the latter frequently with a small basal thorn and macrochaete; interior margin of fixed cheliceral finger bears one large tooth, while that of the movable finger bears two large teeth; mesosomal terga mono- or tri-keeled; subaculear protrusion obsolete to strongly developed, sometimes spinoid; male cauda not broader distad but distinctly longer than that of female, often extremely so; dorsal furrow of caudal segment V shallow or absent; sternite III of basilar area smooth, or at most weakly granular, and sometimes lightly furrowed; trichobothrium D2 more distad than D3; pedipalp tarsus cutting edge bearing from seven to nine oblique rows of denticles (sometimes plus a short apical row of three to five denticles), these rows flanked externally and internally by large, dentate, lateral granules; between the lateral granules are one to four granules that are much smaller and referred to as *supernumerary* granules. These accessory granules, as a rule, do not appear

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until about the fourth instar, and therefore juveniles of the larger species, like *C. gracilis*, might be mistaken for an *Isometrus* species if just this characteristic is used to identify the genus, as is frequently done.

The genus *Centruroides* is apparently entirely an American taxon with its center of distribution in Mexico. It is found from the central United States to Central America, and in the West Indies. A few species have invaded South America as far as Argentina and Chile.

Species Included in the Key

Centruroides aguayo Moreno, 1939; *C. argentinus* Werner, 1939; *C. bertholdi* (Thorell), 1876; *C. bicolor* (Pocock), 1898; *C. chisosarius* Gertsch, 1939; *C. dammanni* Stahnke, 1970; *C. danieli* (Prado and Rios-Patiño), 1939; *C. dasyopus* C. de Mello-Leitão and J. de Araújo Feio, 1950; *C. elegans* (Thorell), 1876; *C. exilicauda* (Wood), 1863; *C. flavopictus* (Pocock), 1898; *C. fulvipes* (Pocock), 1898; *C. gracilis* (Latreille), 1804; *C. hasethi* Pocock, 1902; *C. hentzi* (Banks), 1900; *C. infamatus* (C.L. Koch), 1845; *C. insulanus* (Thorell), 1876; *C. keysi* Muma, 1967; *C. limbatus* (Pocock), 1898; *C. limpidus* (Karsch), 1879; *C. margaritatus* (Gervais), 1841; *C. nigrescens* (Pocock), 1898; *C. nigrimanus* (Pocock), 1898; *C. nigrovariatus* (Pocock), 1898; *C. nitidus* (Thorell), 1876; *C. noxius* Hoffmann, 1932; *C. ochraceus* (Pocock), 1898; *C. pallidiceps* Pocock, 1902; *C. pantheriensis* Stahnke, 1956; *C. rubricauda* (Pocock), 1898; *C. sculpturatus* Ewing, 1928; *C. subgranosus* (Kraepelin), 1898; *C. suffusus* Pocock, 1902; *C. testaceus* (Geer), 1778; *C. thorelli* (Kraepelin), 1891; *C. vittatus* (Say), 1821; *C. zwickeli* Gertsch, 1957.

Key to the Species

- 1a With seven medial oblique rows of denticles on the cutting edge of the pedipalp tarsus. Pecten teeth: Male, 24, female 22 *dasyopus*
Distribution: Andahuaylas, Peru.
- 1b With eight medial oblique rows of denticles on the cutting edge of the pedipalp tarsus (often plus a short apical row of three to five granules), or six rows plus a coalesced row and a short apical row 9
- 1c With nine medial oblique rows of denticles on the cutting edge of the pedipalp tarsus (often plus a short apical row of three to five granules), or seven rows plus a coalesced row and a short apical row 2
- 2a(1c) Color uniformly yellowish. Only female known: Pecten teeth 25; all keels of manus distinctly granular; about 60 mm long; ratio of caudal segment V length to carapace length 1.10; carapace taper 0.38 mm/mm length; ratio pedipalp tibia length to manus width 3.64 *argentinus*
Distribution: Campos Santo, Salto Province, Argentina
- 2b(1c) Uniformly blackish or bicolor without distinct, dark, broad longitudinal bands 3

- 3a(2b) Subaculear tooth close to base of aculeus, its point inclined toward aculeus
..... 4
- 3b(2b) Subaculear tooth away from base of aculeus, its point inclined outward 6
- 4a(3a) Adult animal of uniform blackish color with only tibia fingers, and the ends of
leg tarsi and pedipalp tarsi lighter. Pecten teeth: Males 29-33, females 27-31
..... *nigrescens*
Distribution: Southern part of Guerrero, Mexico and mainly in the coastal
region along the Pacific. It may extend along the coastal regions of Oaxaca.
- 4b(3a) Color not uniformly black; tergite VII may be lighter than other tergites; legs,
pedipalp femur, and at times the patella, yellowish to reddish. 5
- 5a(4b) Pedipalp patella of a light yellowish color similar to femur, but much lighter
than manus. Pecten teeth: Males 33-38, females 29-35. *nigrimanus*
Distribution: Oaxaca, Mexico; Honduras.
- 5b(4b) Pedipalp patella much darker than femur, but same color as manus; tergite VII
paler than others. Pecten teeth: (only female known) 28-29 *fulvipes*
Distribution: Xautipa, Guerrero, Mexico.
- 6a(3b) Color of trunk, legs, chela, and metasoma yellow; edges of terga, pedipalp tibia
fingers and tarsi, and the end of metasoma black. Pecten teeth: Males 23-25,
females 22-23 *linbatus*
Distribution: Sirirea in Talamanca, Costa Rica; Chanquinole, Panama; Quezal-
tenango, Guatemala.
- 6b(3b) At least the carapace and terga (except tergite VII in *bicolor*) blackish or deep
brown 7
- 7a(6b) Tergite VII yellow; pedipalp manus much darker than patella. Pecten teeth:
Males 28-29, females 26-28. *bicolor*
Distribution: Costa Rica; Panama.
- 8a(7b) Granules on metasoma keels few in number and remote from each other.
Pecten teeth: Males 21-23, females 20-21. *rubricauda*
Distribution: Costa Rica.
- 8b(7b) Granules on metasoma keels numerous and close. Pecten teeth: Males 26-36,
females 24-30 *gracilis*
Distribution: Mexico to northern South America: Antilles; Cuba; Jamaica;
Santa Cruz de Tenerife; Florida, United States.
- 9a(1b) Tergites of adults with two broad, dark, longitudinal bands 10
- 9b(1b) Primarily yellow, but tergites with one narrow, median, very dark, longitudinal
band. Pecten teeth: (Only female known) 16-18 *aguayoi*
Distribution: Cuba.
- 9c(1b) Tergites of adults without two dark, longitudinal bands; may be uniformly
colored or variegated bicolor 22

- 10a(9a) Pedipalp tibia finger and tarsus approximately same color as manus 11
- 10b(9a) At least basal half of pedipalp tibia finger and tarsus dark brown to blackish
 20
- 11a(10a) Posterior margin of tergites I-VI yellowish, but pretergites with an intense
 black spot. Pecten teeth: Males 22-26, females 20-25 *elegans*
 Distribution: Jalisco, Guerrero, Nayarit, and Tres Marias Islands, Mexico.
- 11b(10a) Posterior margin of tergites I-VI dark colored; may consist of only a transverse
 row of dark granules 12
- 12a(11b) Pedipalp, legs, and ventral cauda spotted with brown; these markings may be
 very faint 13
- 12b(11b) Not as above 16
- 13a(12a) Large, strongly developed subaculear tooth; median longitudinal row of coarse
 granules on ventral surface of telson vesicle 14
- 13b(12a) Weakly developed subaculear tooth 15
- 14a(13a) Female carapace longer than caudal segment III (ratio over 1.14); ratio of
 pecten length to width at level of first tooth; Males under 5.20, females under
 4.40; ratio of male caudal segment V length to width over 4.25. Pecten teeth:
 males 16-21, females 16-21 *hentzi* and *keysii*
 (Discussion p. 120)
 Distribution: Florida, United States.
- 14b(13a) Female carapace shorter than, or equal to, the length of caudal segment III
 (ratio about 0.96-1.00); ratio of pecten length to width at level of first tooth:
 Males over 5.75, females over 4.75; ratio of male caudal segment V length
 to width under 3.80. Pecten teeth: Males 18-20, females 13-18. *thorelli*
 Distribution: Cuba; central Mexico to Central America.
- 15a(13b) Tergite I-VI with an intense black spot on pretergite, and another larger, but
 more diffuse, spot on posterior border; the two dorsal black longitudinal
 bands begin as a transverse black line on posterior border of carapace. Pecten
 teeth: Males 21-26, females 17-23 *limpidus*
 Distribution: Central Guerrero, Morelos, southern Puebla, and along western
 coast, Mexico.
- 15b(13b) Dark spot on only posterior portion of tergites; spots may be small and very
 faint. Female basal piece with central hole. Pecten teeth: Males 19-23, females
 17-22 *nigrovariatus*
 Distribution: Oaxaca, Mexico.
- 15c(13b) Dark pigment variegated, extending over entire tergite and lightly on
 pretergite; dark pigment often quite faint in adults, but readily recognized in
 young. Carapace of juveniles with four well defined, longitudinal, dark lines
 which become greatly reduced or almost obsolete in adults. Female basal piece

with central hole. Pecten teeth: Males 19-23, females 18-21. *pallidiceps*
Distribution: Sinaloa and parts of Sonora, Mexico.

- 16a(12b) Distinct, well defined black interocular triangle with apex extending just posteriad of ocular tubercle; black pigment extends to posterior margin of carapace as two tapered bands which form two black transverse lines on posterior margin. Female basal piece with central hole. Pecten teeth: Males 24-27, females 22-26. *vittatus*
Distribution: South, central and western United States, and adjacent Mexican states.
- 16b(12b) Interocular triangle not as above 17
- 17a(16b) Entire carapace invaded by dark spots alternating with symmetrically placed light areas; dark pigment on tergites primarily along posterior half; may consist of dark, coarse granules. Female basal piece with central, narrow, elongated, central depression. Pecten teeth: males 27-28, females 24-26 *chisosarius*
Distribution: Chisos Basin, Big Bend National Park, Texas, United States.
- 17b(16b) Carapace light colored laterally and sometimes in area of posterior median furrow; otherwise entire posterior median portion of carapace darker, sometimes in a slightly diffuse manner. 18
- 17c(16b) Carapace light colored except for blackish pigment circling median eyes, sometimes extending diffusely along anterior median keels and spreading lightly throughout interocular triangle; carapace also with two elongate, transverse, dark spots along posterior margin, sometimes extending anteriorly along the crests of median posterior keels and then fanning out laterally as they advance half the length of carapace 19
- 18a(17b) Cauda of adult male at least 8.25 times longer than carapace; caudal segment V of adult male about four times longer than wide; male caudal segment II longer than carapace (ratio about 0.86); ratio of male telson vesicle length to aculeus length over 1.78. Female basal piece with central hole. Pecten teeth: males 21-26, females 20-23 *suffusus*
Distribution: Central portion of state of Durango, Mexico.
- 18b(17b) Cauda of adult male not over 7.5 times longer than carapace; caudal segment V of adult male not over 3.5 times longer than wide; male caudal segment II about same length as carapace (ratio 0.98-1.00); ratio of male telson vesicle length to aculeus length under 1.60. Female basal piece lacks central hole. Pecten teeth; males 23-25, females 21-22 *infamatus*
Distribution: Michoacan, Jalisco, Zacatecas, Durango and Veracruz, Mexico.
- 19a(17c) Cauda ventrally infusate. Ratio of pedipalp tibia length to manus width: Males under 2.50, females under 2.60; ratio telson vesicle length to aculeus length: Males under 1.55, females under 1.16. Male telson ovate to tear-drop shaped. Female basal piece with shallow, broad, gradually sloping central depression; not sharp, pit-like at deepest point. Pecten teeth: Males 18-26, females 17-24. Bicolor phase *exilicauda*
Distribution: Baja California, Mexico.

- 19b(17c) Cauda ventrally not infusate. Ratio of pedipalp tibia length to manus width: Males over 2.80, females over 3.00; ratio of telson vesicle length to aculeus length: Males over 1.80, females over 1.20. Male telson vesicle subcylindrical. Basal piece of female lacks central hole or depression. Pecten teeth: Males 22-29, females 19-26. Bicolor phase *sculpturatus*
Distribution: Arizona, western New Mexico, and eastern California, United States; northern Mexico.
- 20a(10b) Superior keels of pedipalp manus distinctly granular. Ratio of caudal segment I length to width: Males under 1.70, females under 1.30; ratio of pedipalp manus width to patella width: Males about 1.12, females 1.03-1.13. Female basal piece with transversely elongated, central depression. Pecten teeth: Males 20-22, females 17-20. *insulamus*
Distribution: Jamaica; Choco; Brazil.
- 20b(10b) Pedipalp manus superior keels agranular. Ratio of caudal segment I length to width: Males over 1.87, females over 1.40. 21
- 21a(20b) Inferior lateral keels of cauda bearing large serrate granules (in adult males sometimes not distinctly serrate), eg. segment IV of female bears about 20 granules. Ratio of caudal segment IV length to width: Males under 2.80, females under 1.95; ratio of pedipalp manus width to patella width: Males and females over 1.35. All segments of cauda about the same basic color. Pecten teeth: Males 18-24, females 19-20 *nitidus*
Distribution: Puerto Rico; Haiti; Brazil.
- 21b(20b) Inferior lateral keels of cauda bearing small, subserrate granules (in adult males somewhat confluent), eg. segment IV of female bears about 30 granules. Ratio of caudal segment IV length to width: Males over 3.80, females over 2.10; ratio of pedipalp manus width to patella width, male and female under 1.35. Segments I and II of cauda lighter in color than other segments. Pecten teeth: Males 21-25, females 20-24 *dammanni*
Distribution: St. John, Virgin Islands.
- 22a(9c) Pedipalp tibia finger and tarsus, at least at the base, dark brown or blackish, with the manus a lighter color. 23
- 22b(9c) Pedipalp tibia finger and tarsus not darker than manus, but may be lighter than manus 25
- 23a(22a) Carapace (except median ocular tubercle and possibly crests of posterior median keels) and tergites a uniform color 24
- 23b(22a) Carapace and tergites more or less variegated in color. Ratio of caudal segment I length to width: Males under 1.80, females under 1.35. Frequently a fine, light, longitudinal line persists on median keels of tergites of adults; such a line found only on juveniles of other species. Pecten teeth: Males 19-22, females 16-20 *flavopictus*
Distribution: Veracruz and Chipas, Mexico.
- 24a(23a) All keels of sternite VII smooth. Subaculear tooth large and sharp. Pecten teeth: Males 27-28; females 26-28 *ochraceus*
Distribution: Yucatan and Campeche, Mexico

- 24b(23a) Only median keels of sternite VII smooth, seldom slightly granular. Subaculear tubercle minute. Keels obsolete on caudal segment V. Ratio of caudal segment I length to width: Males over 2.00, females over 1.70. Pecten teeth: Males 23-24, females 20-22 *testaceus*
Distribution: Montserrat; Haiti.
- 25a(22b) Fifth caudal segment of a darker color than rest of cauda 26
- 25b(25a) Fifth caudal segment essentially of same color as other segments, never darkened 27
- 26a(25a) Fifth caudal segment in adults only slightly darker than other segments, sharply contrasting in juveniles; diffuse dark ring circles median eyes. Male telson vesicle without rounded, lateral, terminal expansions. Pecten teeth: Males 27-30, females 22-26 *pantheriensis*
Distribution: Big Bend National Park, Texas, United States.
- 26b(25a) Fifth caudal segment much darker than rest of cauda. Male telson vesicle with rounded, lateral, terminal expansions on both sides; small to moderate sized subaculear tooth. Granular keels of tergite VII and cauda black, contrasting sharply with intercarinal spaces. Portions of pedipalps generally densely covered with yellow setae. Adults large, 10 cm long or greater. Pecten teeth: Males 26-34, females 23-32 *margaritatus*
Distribution: Cuba; northern Mexico to northern South America.
- 26c(25a) Fifth caudal segment and lower portion of vesicle darker than other segments; granular keels of tergite VII and cauda almost same color as pedipalps. Pedipalp tarsus with large basal lobe. Strongly developed subaculear tooth which is not near base of aculeus. Ratio of total cauda length to carapace length about 8.00. Pecten teeth: Males 28-29, females 20 *danieli*
Distribution: Colombia (Andes).
- 27a(25b) Subaculear tubercle strongly developed and spinoid. Legs and cauda not infuscate; tergites I-VI blackish, but with a narrow, light colored, lateral band on each side. Adults small, about 4-5 cm long. Pecten teeth: Males 17-21, females 15-19 *noxius*
Distribution: Nayarit and southern Sinaloa, Mexico.
- 27b(25a) Subaculear tubercle obsolete to moderate sized. No narrow, light colored, lateral bands on each side 28
- 28a(27b) Subaculear tubercle of adults obsolete but well developed and spinoid on juveniles. Aculeus and vesicle of telson approximately equal in length. Posterior edge of carapace and all tergites dark brown or black and studded with a transverse row of dark, coarse granules. Superior keels of pedipalp manus well developed and strongly granular. Adults small, about 3-4 cm long. Pecten teeth: Males 17-21, females 15-19 *zweifeli*
Distribution: San Martin Island, Baja California, Mexico.
- 28b(27b) Combination of characters not as above 29
- 29a(28b) Subaculear tubercle moderately developed and spinoid. Telson vesicle of male

- subcylindrical, nearly three times as long as wide. Lateral keels of tergites obsolete, traceable only as a pair of serially arranged granules. Female cauda about 5.5 times as long as carapace, which is about as long as caudal segment IV. Pecten teeth: Males 24-25, females 22-23 *subgranosus*
Distribution: Central America
- 29b(28b) Subaculear tubercle obsolete to small and spinoid. Male telson vesicle not subcylindrical. Tergites with lateral keels at least on anterior half of tergites V and VI. 30
- 30a(29b) Entire superciliary crests of median eyes smooth except for a few granules at extremities. Telson vesicle of male ovate, about twice as long as wide. Pecten teeth: Males 22-26, females 21-23 *bertholdi*
Distribution: Central Jalisco, Mexico.
- 30b(29b) Entire superciliary crests covered with granules 31
- 31a(30b) Ratio of caudal segment V length to width: Males under 3.10, females under 2.40; ratio of caudal segment IV length to width: Males under 2.70, females under 2.10. Pecten teeth: Males 23-29, females 21-27 *haseithi*
Distribution: Curaçao (West Indies).
- 31b(30b) Ratio of caudal segment V length to width: Males over 3.80, females over 2.60; ratio of caudal segment IV length to width: Males over 3.70, females over 2.25 32
- 32a(31b) Ventral cauda not infuscate. Adult male telson vesicle subcylindrical. Ratio of male vesicle length to aculeus length over 1.80; ratio of pedipalp tibia length to manus length: Males over 2.85, females over 2.70. Pecten teeth: Males 22-29, females 19-26. Concolorous phase *sculpturatus*
Distribution: Arizona, western New Mexico, and eastern California, United States; northern Mexico.
- 32b(31b) Ventral cauda may be infuscate. Adult male telson vesicle ovate to tear-drop in shape. Ratio of male vesicle length to aculeus length under 1.65; ratio of pedipalp tibia length to manus length: Males under 2.45, females under 2.55. Pecten teeth: Males 18-26, females 17-24 *exilicauda*
Distribution: Baja California, Mexico.

List of Subspecies

Centruroides elegans elegans (Thorell), 1876; *C. e. guanensis* (Franganillo), 1931; *C. e. insularis* Pocock, 1902; *C. e. meisei* Hoffmann, 1939.

Centruroides flavopictus chamulaensis Hoffmann, 1932; *C. f. flavopictus* (Pocock), 1898; *C. f. meridionalis* Hoffmann, 1932.

Centruroides gracilis gracilis (Latreille), 1804; *C. g. johannis* Moreno, 1939; *C. g. nigrescens* (Franganillo), 1934 (not of Pocock, 1898); *C. g. pectinatissimus* Moreno, 1939; *C. g. ruber* Franganillo, 1936.

Centruroides haseithi arubensis (Bakker), 1963; *C. h. haseithi* Pocock, 1902.

Centruroides infamatus infamatus (C.L. Koch), 1845; *C. i. ornatus* Pocock, 1902.

Centruroides insulanus barbudensis (Pocock), 1898; *C. i. insulanus* (Thorell), 1876.

- Centruroides limpidus limpidus* (Karsch), 1879; *C. l. tecomanus* Hoffmann, 1932.
Centruroides margaritatus chiapanensis Hoffmann, 1932; *C. m. margaritatus* (Gervais), 1841; *C. m. morenoi* Mell-Leitao; *C. m. septentrionalis* Hoffmann, 1932; *C. m. tapachulaensis* Hoffmann, 1932.
Centruroides nigrovariatus baergi Hoffmann, 1932; *C. n. nigrovariatus* (Pocock), 1898.
Centruroides suffusus chiaravigili Borelli, 1915; *C. s. suffusus* Pocock, 1902.
Centruroides testaceus exsul (Meise), 1933; *C. t. testaceus* (Geer), 1778.
Centruroides thorelli cubensis Moreno, 1940; *C. t. thorelli* (Kraepelin), 1891.

Synonyms of Species of *Centruroides*

- C. biaculeatus*; *Androctonus biaculeatus* Lucas, 1835 = *C. gracilis*
C. californicus; *Scorpio (Atreus) californicus* Girard, 1853 = ? *C. exilicauda*.
C. carinatus; *Tityus carinatus* C.L. Koch, 1845 = *C. margaritatus*.
C. congerer; *Tityus congerer* C.L. Koch, 1845 = *C. gracilis*.
C. degeeri; *Scorpio (Atreus) degeeri* Gervais, 1844 = *C. gracilis*.
C. denticulatus; *Tityus denticulatus* C.L. Koch, 1845 = ? *C. gracilis*.
C. ducalis; *Tityus ducalis* C.L. Koch, 1845 = *C. margaritatus*.
C. edwardsi; *Scorpio (Atreus) edwardsi* Gervais, 1844 = *C. margaritatus*.
C. gambiensis; *Centrurus gambiensis* Karsch, 1879 = *C. margaritatus*.
C. gertschi; *Centruroides gertschi* Stahnke, 1940 = *C. sculpturatus*.
C. granosus; *Centrurus granosus* Thorell, 1877 = *C. margaritatus*.
C. griseus; *Scorpio griseus* Fabricius, 1793 = ? *C. testaceus*.
C. heterurus; *Centrurus heterurus* Karsch, 1879 = *C. gracilis*.
C. macrurus; *Tityus macrurus* C.L. Koch, 1845 = *C. margaritatus*.
C. mulatinus; *Tityus mulatinus* C.L. Koch, 1845 = *C. gracilis*.
C. nebulosus; *Tityus nebulosus* C.L. Koch, 1845 = *C. gracilis*.
C. nigrifrons; *Scorpio (Atreus) nigrifrons* Berthold, 1846 = *C. gracilis*.
C. olivaceus; *Centrurus olivaceus* Thorell, 1877 = ? *C. vittatus*.
C. republicanus; *Centrurus republicanus* Karsch, 1879 = *C. nitidus*.
C. sayi; *Scorpio (Atreus) sayi* Girard, 1853 = *C. gracilis*.
C. serenus; *Tityus serenus* C.L. Koch, 1845 = ? *C. testaceus*.
C. subviridus; *Centruroides subviridus* Franganillo, 1929 = *C. gracilis*.
C. tenuis; *Centrurus tenuis* Thorell, 1877 = *C. nitidus*.

Synonymy of Other *Centrurus* Species

- C. agamemnon* (C.L. Koch), Kraepelin, 1899 = *Rhopalurus agamemnon*.
C. americanus (Herbst), Peters, 1861 = *Isometrus maculatus*.
C. barythener Penther, 1913 = *Rhopalurus rochai*.
C. galbinea C.L. Koch, 1838 = *Heterometrus longimanus* (Scorpionidae).
C. hemprichii (Gervais), Kraepelin, 1891 = *Rhopalurus junceus*.
C. junceus (Herbst), Kraepelin, 1899 = *Rhopalurus junceus*.
C. koesteri Kraepelin, 1911 = *Rhopalurus testaceus*.
C. laticauda (Thorell), Kraepelin, 1891 = *Rhopalurus laticauda*.
C. phaiodactylus Wood, 1863 = *Anuroctonus phaiodactylus* (Vejovidae).
C. princeps Karsch, 1879 = *Rhopalurus princeps*.
C. stenochirus Penther, 1913 = *Rhopalurus stenochirus*.
C. trilineatus Peters, 1861 = *Buthotus trilineatus*.

Discussion

In previous taxonomic considerations of the genus *Centruroides*, color and color patterns have been weighted too heavily in the determination of species. As a result, artificial species have been created. This was illustrated by Stahnke's (1971) study of *C. gertschi* Stahnke and *C. sculpturatus* Ewing in which it was conclusively shown that *C. gertschi* was merely a color phase of *C. sculpturatus*. In a recent study of a series of litters taken from females of a mixed color pattern population (unpublished data), we observed a similar situation in *C. exilicauda* (Wood). Hoffmann's (1932) key to the species of this genus illustrates this overemphasis on color pattern. His first dichotomy, "unstriped species" vs. "striped species", thus, according to present evidence, automatically created artificial species. Present evidence (unpublished data) indicates that it is highly probable that *C. vittatus* (Say), *C. chisosarius* Gertsch and *C. pantheriensis* Stahnke are merely different color phases of the same species. Other observations of a similar nature make it appear highly probable that this condition exists throughout the genus.

A study of three litters (unpublished data) of *C. hentzi* (Banks) revealed that some females had a central hole in the pecten basal piece while others of the same litter did not. In addition, the color patterns in each litter were also variable. This suggests the *C. hentzi* and *C. keysi* Muma may be conspecific and consequently were placed together in the key.

A serious study of speciation within the genus is needed so that the species taxa may be more correctly known. This is important to other disciplines interested in the genus from the standpoint of giving greater validity to their results. Since the lethal scorpions of the United States and Mexico are *Centruroides* an improvement in our systematics of the genus would be of considerable importance to the field of medicine.

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